

Claims

What is claimed is:

1. A video graphics module comprises:

5 a plurality of video graphics pipelines, wherein each of the plurality of video graphics pipelines is operable to process a corresponding image layer and wherein one of the plurality of video graphics pipelines processes a foremost image layer; and

10 a blending module operably coupled to the plurality of video graphics pipelines, wherein the blending module blends, in accordance with a blending convention, the corresponding image layers in a predetermined blending order to produce an output image having the foremost image layer blended in a foremost position with respect to the other corresponding image layers with negligible loss of information of the other corresponding image layers.

15 2. The video graphics module of claim 1, wherein the blending convention further comprises at least one of: AND/XOR blending and alpha blending.

20 3. The video graphics module of claim 2, wherein the alpha blending further comprises a specified per pixel alpha value or a global alpha value, wherein the alpha blending is performed using one of a plurality of pixel depths.

25 4. The video graphics module of claim 2, wherein the AND/XOR blending further comprises one of a plurality of pixel depths.

30 5. The video graphics module of claim 1, wherein the predetermined blending order further comprises blending at least two of the corresponding image layers to produce an intermediate blended image, and subsequently blending the foremost image layer with the intermediate blended image.

6. The video graphics module of claim 1, wherein the blending module further comprises a first mixing module and a second mixing module, wherein the first mixing module blends at least two of the corresponding image layers to produce an intermediate blended image, and wherein the second mixing module blends the foremost image layer
5 with the intermediate blended image.

7. The video graphics module of claim 6, wherein the first mixing module further comprises:

10 a first input for receiving one of the at least two of the corresponding image layers;

a second input for receiving another one of the at least two of the corresponding image layers:

15 a blending module operably coupled to blend the at least two of the corresponding image layers based on an alpha calculation using a specified alpha value; and

an alpha value calculation module operably coupled to the blending module, wherein the alpha value calculation module generates the specified alpha value based on at least one
20 of: a global alpha value, a per pixel value associated with at least one of the at least two of the corresponding image layers, and a blending mode selection.

8. The video graphics module of claim 6, wherein the second mixing module further comprises:

25

a first input for receiving the intermediate blended image;

a second input for receiving the foremost image layer; and

blending module operable to blend the intermediate blended image and the foremost image layer based on a mixing selection to produce the output image.

9. The video graphics module of claim 1, wherein each of the corresponding image
5 layers has a color base of at least one of: an RGB color base and a YUV color base.

10. The video graphics module of claim 9, wherein the one of the plurality of video
graphics pipelines that is processing the foremost image layer produces a first foremost
image layer having the RGB color base and a second foremost image layer having the
10 YUV color base.

11. The video graphics module of claim 9, wherein the plurality of video pipelines
processes the corresponding image layers to have the RGB color base, and wherein the
blending module further comprises:

15 an RGB blending module operably coupled to produce the output image having
the RGB color base;

an RGB to YUV conversion module operably coupled to convert corresponding
20 image layers to have the YUV color base, and

a YUV blending module operably coupled to produce the output image having the
YUV color base from the corresponding image layers having the YUV color base.

12. A video graphics module comprises:

a video graphics pipeline module operable to process at least one image layer;

5 a hardware cursor pipeline operable to process a cursor image; and

a blending circuit operably coupled to the video graphics pipeline and the hardware cursor pipeline, wherein the blending module blends, in accordance with a blending convention, the at least one image layer and the cursor image to produce an output image
10 having the cursor image alpha blended with the at least one corresponding image layer.

13. The video graphics module of claim 12, wherein the blending convention further comprises at least one of: AND/XOR blending and alpha blending.

15 14. The video graphics module of claim 13, wherein the alpha blending further comprises a specified per pixel alpha value or a global alpha value, wherein the alpha blending is performed using one of a plurality of pixel depths.

15. The video graphics module of claim 13, wherein the AND/XOR blending further
20 comprises one of a plurality of pixel depths.

16. The video graphics module of claim 12, wherein the at least one image layer includes a plurality of image layers, wherein the blending circuit blends the plurality of images layers and the cursor image layer in a predetermined blending order, wherein the
25 predetermined blending order further comprises blending at least two of the plurality of image layers to produce an intermediate blended image, and subsequently blending the cursor image layer with the intermediate blended image.

17. The video graphics module of claim 16, wherein the blending circuit further
30 comprises a first mixing module and a second mixing module, wherein the first mixing

module blends the at least two of the plurality of image layers to produce the intermediate blended image, and wherein the second mixing module blends the cursor image layer with the intermediate blended image.

- 5 18. The video graphics module of claim 17, wherein the first mixing module further comprises:

a first input for receiving one of the at least two of the plurality of image layers;

- 10 a second input for receiving another one of the at least two of the plurality of image layers:

a blending module operably coupled to blend the at least two of the plurality of image layers based on an alpha calculation using a specified alpha value; and

15

an alpha value calculation module operably coupled to the blending module, wherein the alpha value calculation module generates the specified alpha value based on at least one of: a global alpha value, a per pixel value associated with at least one of the at least two of the image layers, and a non-alpha blend mode.

20

19. The video graphics module of claim 17, wherein the second mixing module further comprises:

a first input for receiving the intermediate blended image;

25

a second input for receiving the cursor image layer; and

blending module operable to alpha blend the intermediate blended image and the cursor image layer to produce the output image.

30

20. The video graphics module of claim 12, wherein the blending circuit further comprises:

a first input for receiving the at least one image layer;

5

a second input for receiving the cursor image layer; and

blending module operable to alpha blend the at least one image layer and the cursor image layer to produce the output image.

10

21. The video graphics module of claim 12, wherein the at least one image layer and the cursor image each has a color base of at least one of: an RGB color base and a YUV color base.

15

22. The video graphics module of claim 21, wherein the hardware cursor pipeline produces a first cursor image having the RGB color base and a second cursor image having the YUV color base.

20

23. The video graphics module of claim 21, wherein the video pipeline processes the at least one image layer to have the RGB color base, wherein the hardware cursor pipeline processes the cursor image to have the RGB color base, and wherein the blending module further comprises:

25

an RGB blending module operably coupled to produce the output image having the RGB color base;

an RGB to YUV conversion module operably coupled to convert the at least one image layer and the cursor image to each have the YUV color base, and

a YUV blending module operably coupled to produce the output image having the YUV color base from the at least one image layer having the YUV color base and the cursor image having the YUV color base.

24. An apparatus for determining an alpha calculation mode, the apparatus comprises:

a processing module; and

- 5 memory operably coupled to the processing module, wherein the memory stores operational instructions that cause the processing module to (a) determine an alpha blending mode; (b) obtaining blending information based on the alpha blending mode; (c) generating a corresponding blending value based on the blending information; and (d) providing the corresponding blending value to a blending module.

10

25. The apparatus of claim 24, wherein the memory further comprises operational instructions that cause the processing module to, when the alpha blending mode indicates using a global alpha blending value, retrieve at least one global alpha value from a
15 general alpha register.

- 20 26. The apparatus of claim 24, wherein the memory further comprises operational instructions that cause the processing module to, when the alpha blending mode indicates using a per pixel alpha blending value, retrieve at least one corresponding per pixel alpha blending value from an image layer input.

25

27. The apparatus of claim 24, wherein the memory further comprises operational instructions that cause the processing module to, when the alpha blending mode indicates using a key alpha blending value, retrieve an alpha key indication from a keyer, wherein

the keyer generates the alpha key indication from at least one corresponding per pixel alpha value associated with an image layer input.

28. A video graphics data blending circuit comprises:

a first input for receiving a first image layer;

5 a second input for receiving a second image layer:

a blending module operably coupled to blend the first and second image layers based on an alpha calculation using a specified alpha value; and

10 an alpha value calculation module operably coupled to the blending module, wherein the alpha value calculation module generates the specified alpha value based on at least one of: a global alpha value, a per pixel value associated with at least one of the first and second image layers, and a non-alpha blend mode.

15 29. The video graphics data blending circuit of claim 28, wherein the alpha value calculation module further comprises firmware that, for the non-alpha blend mode, detects a color key in at least one of the first and second image layers to produce a color key result, and generates the specified alpha value as a fully transparent value or a fully opaque value based on the color key result.

20 30. The video graphics data blending circuit of claim 28, wherein the blending module further comprises firmware for performing the blending of the first and second image layers using a premultiplied alpha blending process or a non-premultiplied alpha blending process.

25 31. The video graphics data blending circuit of claim 28 further comprises a first multiplexor operably coupled to the first input and a second multiplexor operably coupled to the second input, wherein the first multiplexor is operably coupled to receive a plurality of image layers and to output the first image layer and the second multiplexor is

operably coupled to receive the plurality of image layers and output the second image layer.

32. The video graphics data blending circuit of claim 31, wherein the alpha value
5 calculation module further comprises firmware that provides control information to the
first and second multiplexors such that the first multiplexor outputs the first image layer
and the second multiplexor outputs the second image layer.